

ELECTRICAL CONTACT FOR COMPOUND SEMICONDUCTOR DEVICE AND METHOD FOR FORMING SAME

Inventors: Richard S. Burton, Kyushik Hong, Philip C. Canfield

ABSTRACT

A method of manufacturing a semiconductor device having an improved ohmic contact system to epitaxially grown, low bandgap compound semiconductors. In an exemplary embodiment, the improved ohmic contact system comprises a thin reactive layer of nickel deposited on a portion of an epitaxially grown N⁺ doped InGaAs emitter cap layer. The improved ohmic contact system further comprises a thick refractory layer of titanium or other suitable material deposited on the thin reactive layer. Both the reactive layer and the refractory layer are substantially free of gold and other low resistivity, high conductivity metal overlayers. The improved ohmic contact system and method for forming the same minimize contact resistance, improve reliability and the long-term stability of the electrical characteristics of the device, minimize raw material costs, and decrease manufacturing costs on high performance semiconductor devices, such as heterojunction bipolar transistors, laser diodes, light emitting diodes (LEDs), Schottky diodes, field effect transistors (FETs), metal-semiconductor field effect transistors (MESFETs), metal-oxide-semiconductor field effect transistors (MOSFETs), high electron mobility transistors (HEMTs), and other compound semiconductor and optoelectronic devices.

009503-09300